

The Canadian Entomologist.

VOL. IV.

LONDON, ONT., APRIL, 1872.

No. 4

DESCRIPTIONS OF NORTH AMERICAN HYMENOPTERA, No. 2.

Continued from Page 24.

BY E. T. CRESSON, PHILADELPHIA.

Family ICHNEUMONIDÆ.

Genus PEZOMACHUS, Grav.

1. PEZOMACHUS PETTITIL. *N. sp.*—♀.—Head piceous-black, face rufo-piceous, the middle longitudinally prominent; mandibles fuscous; antennæ longer than head and thorax, pale ferruginous, dusky at tips; thorax nearly as long as abdomen, piceous-brown, paler laterally and beneath, nodes subequal; legs entirely piceous-brown; abdomen ovate beyond first segment, shining piceous-black; first segment narrow, slightly dilated behind the lateral tubercles which are not prominent, apical margin pale; sometimes the head, thorax and abdomen are entirely piceous-black, except the pale band at apex of first segment which is always conspicuous in this species; ovipositor short, about as long as first abdominal segment. Length .14—.15 inch.

Hab.—Ontario, Canada. Two specimens received from Johnson Pettit, Esq., of Grimsby, after whom this easily recognized species is named.

2. PEZOMACHUS GENTILIS. *N. sp.*—♀.—Head entirely black; antennæ longer than head and thorax, pale ferruginous, fuscous at tips, and dark at incisures of joints; thorax nearly as long as abdomen, anterior node ferruginous, larger than posterior one which is convex and black; legs honey-yellow, tibiæ and tarsi yellowish; abdomen fuscous, ovate beyond first segment which is pale at base, and scarcely dilated behind the prominent lateral tubercles; basal and apical margins of second segment faintly pale; ovipositor rather longer than first abdominal segment. Length .12 inch.

♂.—Black; antennæ blackish, ferruginous at base; prothorax, legs and first abdominal segment ferruginous or honey-yellow; second, third and most of fourth segments pale honey-yellow, apical segment black; wings ample, hyaline, iridescent, with a faint cloud beneath stigma, which

is large, fuscous and whitish at base; abdomen much narrower than in ♀. Length .12 inch.

Hab.—Pennsylvania. Bred, along with numerous specimens of *Mesochorus scitulus*, Cress., from a bunch of lemon-yellow cocoons (probably those of a *Microgaster*), found attached to a blade of grass.

3. PEZOMACHUS TANTILLUS. *N. sp.*—♀.—Slender; head large, piceous-black; mandibles and palpi testaceous; antennæ about three-fourths the length of body, pale testaceous, thickened and dusky beyond middle; thorax brown, prothorax testaceous, nodes subequal, posterior one rather more gibbous; legs long, slender, luteous; abdomen longer than head and thorax, oblong-ovate beyond first segment, subdepressed, fuscous; first segment narrow, slightly dilated at apex and testaceous; ovipositor rather longer than first abdominal segment. Length .09 inch.

Hab.—Illinois. One specimen. About the size of *minimus*, Walsh, but more slender in form and with a larger head.

4. PEZOMACHUS MEABILIS. *N. sp.*—♀.—Head and thorax reddish-brown, face paler; antennæ pale luteous, dusky at tips; nodes of thorax subequal, posterior one more gibbous, disk and sides of anterior node marked with testaceous; legs pale testaceous, the femora and tibiæ varied with dusky; abdomen piceous-black, not longer than head and thorax, ovate and convex beyond first segment and shining; first segment narrow, slightly dilated behind middle, with a pale testaceous band at apex; apical margin of second segment slightly pale; ovipositor as long as first abdominal segment. Length .12 inch.

Hab.—Illinois. One specimen. Same form as *Pettitii*, but smaller, more slender, and with much paler legs.

5. PEZOMACHUS OBSCURUS. *N. sp.*—♀.—Robust, closely and minutely punctured; head large, blackish, face and cheeks yellowish-brown, palpi pale; antennæ pale testaceous, dusky at tips; thorax yellowish, varied with fuscous on posterior face of the nodes and laterally, nodes subequal; legs dull luteous, tips of the coxæ and trochanters pale, posterior femora and tibiæ, and base of all the coxæ, more or less tinged with fuscous; abdomen robust, convex, short ovate beyond first segment, piceous; first segment narrow, dull yellowish, second fuscous, with apical margin dull yellowish; ovipositor rather longer than first abdominal segment. Length .13 inch.

Hab.—New Jersey.

6. PEZOMACHUS CANADENSIS. *N. sp.*—♀.—Head black; mandibles rufous; palpi pale; antennæ black, base of flagellum yellowish; thorax

honey-yellow, shining, not nodose; metathorax rather larger than pro. and mesothorax, convex and somewhat prominent posteriorly; legs honey-yellow, the femora more or less fuscous; abdomen ovate, first two segments pale honey-yellow, remainder black, with a slight iridescent reflection; first segment broadly dilated at apex; ovipositor longer than first and second abdominal segments. Length .13 inch.

Hab.—Ontario, Canada. (Saunders). Three specimens. A very pretty, and easily recognized species.

7. PEZOMACHUS COMPACTUS. *N. sp.*—♀.—Short, compact, robust, bright honey-yellow; antennæ with short compact joints, apex slightly dusky; thorax short, nodose, posterior node shortest, and transversely subcompressed; legs more robust than usual; abdomen subglobose, the third and following segments black, the first segment considerably dilated at apex; ovipositor very short. Length .12 inch.

Hab.—Illinois. A very distinct species from its compact robust form, and is distinguished at once from *canadensis* by the head being concolorous with the thorax.

8. PEZOMACHUS DIMIDIATUS. *N. sp.*—♀.—Honey-yellow, more or less tinged with rufous; antennæ long, slender, yellowish beneath, dusky above; nodes of thorax subequal, the anterior one with a medial longitudinal groove; legs concolorous with thorax, tips of coxæ, trochanters and knees yellowish, posterior tibiæ dusky at tips; abdomen ovate beyond first segment, convex, shining; first and second segments dull honey-yellow, apex of second yellowish, third and remaining segments dark brown or rufo-piceous, sometimes the third segment is pale brown; first segment rather suddenly dilated behind middle; ovipositor about one-third the length of abdomen. Length .17 inch.

Hab.—Massachusetts; Illinois. Two specimens.

9. PEZOMACHUS GRACILIS. *N. sp.*—♀.—Honey-yellow, more or less tinged with rufous; antennæ long, slender, yellowish throughout; thorax as in *dimidiatus*, except that the anterior node has no median sulcus; legs long and slender, entirely yellowish; abdomen shaped as in *dimidiatus*, except that the first segment is more gradually and less dilated at apex, honey-yellow and yellowish at tip; second segment fuscous, with apical margin yellowish; third and fourth segments fuscous, sometimes the apical margin of the latter faintly yellowish; apical segments dull yellowish; ovipositor longer than first abdominal segment. Length .20 inch.

Hab.—Pennsylvania. Two specimens.

10. PEZOMACHUS MACER. *N. sp.*—♂.—Long, narrow, apterous; head yellowish-brown, clypeus paler, vertex dusky; antennæ as long as body, slender, dusky, scape pale yellowish; thorax long, yellowish-brown, blackish on posterior portion of the nodes which are subequal; tegulae whitish; wings wanting; legs long, slender, dull yellowish, posterior pair dusky; abdomen long, linear, black, the first and apical margin of second segment yellowish. Length .20 inch.

Hab.—Pennsylvania. This may be the ♂ of *gracilis* or *dimidiatus*.

11. PEZOMACHUS ALTERNATUS. *N. sp.*—♀.—Dull honey-yellow or pale rufous; antennæ yellowish, with the joints shorter than usual; thoracic nodes subequal, convex above, prothorax tinged with yellowish; tips of posterior tibiae slightly dusky; abdomen ovate, convex, polished; first segment honey-yellow, rapidly dilated to apex which is pale, remaining segments brown or piceous on basal half, shading into yellow at apex; ovipositor very short. Length .18 inch.

Hab.—Illinois. More robust than *gracilis* which it resembles; the antennal joints are, however, shorter, and the anterior node of thorax more convex.

12. PEZOMACHUS TEXANUS. *N. sp.*—♀.—Long, slender, pale honey-yellow; head large, vertex dusky; antennæ longer than head and thorax, the joints beyond middle with dusky incisures; thoracic nodes subequal and convex; abdomen ovate beyond first segment, convex, base of second and third segments more or less fuscous; first segment unusually long and slender, and scarcely dilated at apex; ovipositor nearly as long as first abdominal segment. Length .15 inch.

Hab.—Texas. (Belfrage). Very distinct by the long and slender first abdominal segment.

PEZOMACHUS UNICOLOR. *N. sp.*—♀.—Entirely pale ferruginous, shining; antennæ dusky at tips; thoracic nodes subequal, convex; abdomen ovate beyond first segment, which is gradually dilated to apex; ovipositor as long as abdomen, sometimes longer, pale honey-yellow, sheaths black. Length .16—.18 inch.

Hab.—Massachusetts; Delaware; Illinois. Four specimens.

CATERPILLARS IN BELGIUM.—The Provincial Council of Brabant has published a decree to the effect that as the regular annual destruction of caterpillars and other insects, which takes place in February, has not been found to clear the land of these pests, all owners and occupiers of land are enjoined to clear their trees, shrubs, hedges and bushes of caterpillars during the month of November, as better results are anticipated.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KY.

Continued from page 44.

HOLCOCERA, *Clemens*.

This genus approaches *Gelechia*, but not so nearly as *Anarsia*, *Parasia*, &c., the hind wings being sublanceolate, and not emarginate beneath the apex, and having a different neurulation. Dr. Clemens describes four species, only one of which, *H. chalcifrontella*, is known to me. *Gelechia glandulella*, Riley, belongs here. The genus is divisible into two branches.

A. In which the median vein of the hind wings gives off one branch before the transverse vein and a furcate branch behind it, and the curved apical branch.

1. *H. chalcifrontella*, Clem. *Proc. Ent. Soc. Phila.*, 1863, p. 122.

The other three species described by Clemens most likely belong to this section, as he mentions no other form of neurulation.

B. In which the median gives off two veins before the transverse one, and one, besides the apical, behind it (as if the furcate vein of section A had been divided, and one branch transferred before the transverse vein).

2. *Gelechia (Holcocera) glandulella*, Riley, *ante Vol. 3*, p. 118.

ANARSIA.

- A. Obiqui-strigella*. *N. sp.*

Palpi with the second joint dark brown beneath; white above and at the tip. Third joint dark brown, with a white annulus at the base, and another about the middle. Face white. Antennæ with the basal joint white, stalk annulate alternately, with dark, greyish-brown and white. Thorax and wings white, thickly dusted with pale grey-brown. A dorsal brown streak, near the base, points obliquely backwards towards a small costal brown spot, and reaches more than half across the wing. An oblong, costal, dark brown spot about the apical fourth of the wing, a discal, oblong streak opposite the space between the costal spots, and another small one near the beginning of the ciliæ, and another large one in the apical portion touching the costal margin near the apex. Sometimes these discal and apical streaks are continuous, forming a streak from the middle of the wing to the apex.

Alar ex. $\frac{3}{8}$ inch. Larva unknown. Kentucky. The terminal joint of the palpi in this species is not roughened, but the proportions of the

joints, and the neuration of the wings, and opaque spot on the costa, are those of *Anarsia*.

EVAGORA.

E. difficilisella. *N. sp.*

Palpi and antennæ dark brown ; tip of the second joint of the palpi, and two annulations on the terminal one, white. Head, thorax and anterior wings, hairy. A minute dark brown spot (wanting in many specimens) at the base, just within the dorsal margin. A large, bronzy, dark brown spot, with purplish reflections, on the base of the costa, a small one about the basal one-fourth, another larger about the middle of the costal margin, a small one at the beginning of the dorsal ciliæ, one, two or three on the disc, a larger, somewhat scattered, patch in the apical portion, and a row of about eight around the apical margin. Ciliæ pale fuscous, dusted with hoary scales. The costal and one discal spot margined with yellowish. *Alar ex.* $\frac{3}{8}$ inch. Kentucky. Common.

PARASIA.

The preceding genus scarcely differs, generically, from this. Indeed, so little, that I doubt greatly the propriety of their separation, the only differences in the imago being slight ones in the neuration of the wings.

P. apici-strigella. *N. sp.*

Silvery, suffused with pale yellowish ; apex of the forewings deeply suffused with reddish-ochreous, and finely sprinkled with white (each scale tipped with white.) There is a very oblique short white streak about the middle of the costa, dark margined on both sides ; behind it, at the beginning of the ciliæ, is a long narrow unmargined white streak, passing obliquely to the middle of the apical part of the wing, where it almost meets an opposite dorsal obliquely curved long white streak ; behind the costal streak are three short straight white costal streaks, the last of which is nearly opposite to a small straight white dorsal streak, which forms the internal margin of a dark brown dorso-apical spot. Ciliæ composed of three rows of reddish ochreous scales, each tipped with white, forming three wide reddish ochreous bands, separated by three narrow white lines. *Alar ex.* nearly $\frac{1}{2}$ inch. Kentucky.

This is evidently very near *P. apici-punctella*, Clem.

GELECHIA.

This huge genus comprehends a somewhat heterogeneous assemblage of small moths having a certain general resemblance, but differing from each other considerably in size, in the neuration of the wings, and the

amount of the excision of the hind wings, and the size and shape of the labial palpi, and yet more in the habits of the larvæ.

In the living insect the wings are deflexed in repose, thus differing from *Depressaria*, and some other allied genera. In many species, the posterior margin of the hind wings is deeply excised beneath the costa; in others, the emargination is small or none. The antennæ are slender and simple, and usually about three-fourths as long as the wings. The maxillary palpi are microscopic, whilst the labial are long, overarching the vertex, with the third joint pointed, and about two-thirds as long as the second, which is enlarged, though not brush-like beneath.

It is, perhaps, the largest genus among the *Micros*, and, widely as some of the species differ from each other, it has not yet been found practicable to effect a natural division of it. The habits of the larvæ are very diverse, some of them being leaf miners, some making galls in stems of plants, some feeding inside of nuts and fruits, while others are external feeders. There is no "pattern of coloration" peculiar to this genus, the species of which are of all shades and colours. It is a genus of very wide distribution, and some of the species are common, now at least (whatever they may have once been), to both continents, and to many regions in both.

1. *Gelechia Hermannella*, Stainton. *Nat. Hist. Tin.*, v. 9, p. 262.

This unique and handsome species is described, and the synonymy given, by Stainton, with a good figure (fig. 3, plate 8). The longitudinal silvery streaks are, however, a little more elongated in the figure than in my specimens, so as to connect the transverse markings. It occurs almost all over Europe, but has not heretofore been recorded from this country. I have found it mining the leaves of species of *Chenopodium* in Kentucky and Wisconsin. The larva, at first, is white; but, towards maturity, eight crimson spots make their appearance on each segment; four on top and two on each side. (Stainton says four, but in all of my specimens there are eight). Sometimes some of the spots are confluent. It enters the leaf from the upper surface, and frequently leaves an old mine to construct a new one. Frequently the leaves are scarred or blotched by numerous mines, and sometimes the whole leaf is mined, but in such cases there are several larvæ in a mine. The typical form of the mine seems to begin as a point, from which it passes, gradually widening, first to one side, then to the other, in a series of loops, each extending a little farther than the preceding, like a band gradually widening, wound around a cone. The frass is scattered through the mine.

I quote Mr. Stainton's description :—

Alar ex. 4 to $4\frac{1}{2}$ lines. Head and face (and thorax) dark bronzy grey (with purplish reflections). Antennæ blackish. Anterior wings bright reddish-orange, with the base black (the black being externally margined with silvery on the costa), a short oblique streak from the costa near the base, and a small spot near the inner margin, are silvery ; before the middle, is a slender, slightly oblique, silvery fascia (interrupted by the fold), margined with black, and followed by a black blotch on the costa ; beyond it are three short longitudinal silvery streaks, one on the costa, one on the disc, and one, much shorter, on the fold. On the costa, before the apex, is a short (? it can hardly be called short, either in Mr. Stainton's figure or in my specimens) silvery streak pointing inwards, and on the inner margin at, the anal angle, is a small silvery spot ; these appear to represent the usual subapical spots ; a few silvery scales lie towards the middle of the hind margin, which is otherwise black. (In my specimens there are, on the dorso-apical margin, instead of these markings two distinct silvery spots separated by a small blackish spot) ; ciliae blackish. Posterior wings dark greyish fuscus, with the ciliae rather paler.

The portions above included in brackets are interpolations by me.

2. *G. tephriasella*. *N. sp.*

Palpi with the second joint dark brown, tipped with white, third joint brown, dusted with white, and with a white annulus before the tip. Head pale whitish-grey, each scale tipped with white. Antennae with alternate annulations of grey and white, with five or six very distinct white ones, more widely separated towards the apex. Fore wings and thorax pale grey, about equally intermixed with white, becoming gradually darker grey and fuscous towards the tip, each of the darker scales tipped with white. There is a small, very oblique white streak or spot on the costa, just behind the middle, and at the beginning of the costal ciliae the wing is crossed by a narrow white fascia. An indistinct fuscous hinder marginal line or row of spots at the base of the ciliae, which are of the general hue.

Alar ex. about $\frac{3}{8}$ inch. Kentucky. Larva unknown. Having but a single specimen, I have not examined the neururation of the wings, but I think it is a true *Gelechia* probably allied to *G. rhoifrutella*, Clem.

3. *G. palpiannulella*. *N. sp.*

Shining bronzy dark brown ; there is a whitish ring around the end of the second palpal joint, and another around the middle of the third one, and a small, very pale, yellowish costal spot just before the ciliae, and an

opposite dorsal one, and one within the dorsal margin about the middle. Posterior wings yellowish-brown. *Alar ex.* $\frac{3}{8}$ inch. Kentucky. Common. Larva and food plant unknown. Captured in July to September. The neuration differs a little from that of *G. roseosuffusella*. Possibly this may be *G. mimella*, Clem., which it seems to resemble closely. But Clemens says there is an "ochreous band near the tip," instead of the opposite costal and dorsal spot of this species; and he speaks of a few dark brown spots upon the costa and in the apical portion of the wing, which I can not discover in this species, and he describes it as tawny brown. I think this is a true *Gelechia*.

It must bear considerable resemblance to the European *G. Anthyllidella*, figured by Stainton.

4. *G. roseosuffusella*, Clem. *Proc. Acad. Nat. Sci., Phila., 1860, p. 162.*

This is our commonest species. There is great difference in the extent and intensity of the roseate hue of the wings. In some specimens it is scarcely perceptible, in others it is very distinct, and spreads over the greater portion of the wing. *Alar ex.* $\frac{1}{16}$ inch.

ERRATA.—V. 3., p. 206, for *L. vitifoliella* read *P. vitifoliella*, and for *P. ampelopsifoliella* read *P. ampelopsiella*. P. 222, for "*cephalanthiella*" read *cephalanthiella*.

V. 4., p. 10, for "*powdered*," in line 9 from the bottom, read *produced*. and p. 12, at the end of the 1st line, for "there" read *thus*.

ON A NEW CHECKERED HESPERIA.

BY AUG. R. GROTE, DEMOPOLIS, ALABAMA.

A common species of *Hesperia* in central Alabama, and that I do not find described by authors, is one that I call *Syrictus communis*. It is plentiful from early spring to autumn, and must be several brooded, but I have not found the larva.

The male is a little smaller, and the white checkered spots are altogether larger and more numerous, than in the female. The ground colour of the wings is a brownish black, and longer bluish white hair spreads from the base of the forewings over the inferior portion of the primaries, and from the base of the hind wings downwardly without touching the abdominal margin. A more prominent median band of white spots, three

in number, below the median vein, divided by the sub-median nervure and fold, and surmounted by one on the disc larger within the three. Clustered minute linear dots between the sub-costal veinlets at the base, and below them three larger, divided by the discal fold and median vein opposite the cell. A series of subterminal white dots, the three lower the larger. Terminal minute interspaceal dots; fringes white, interrupted. Costal edge white, dotted externally. Secondaries with a broader series of mesial spots, reduced in size inferiorly, a subterminal and a minute terminal series of white spots and dots; fringes white, less interrupted than on primaries. Beneath, the secondaries are whitish, with four series of olivaceous, darkly margined, incomplete and irregular bands. A black subtriangular shaded spot at anal angle. Body whitish beneath, above blackish with longer bluish or greenish hair; abdomen obsoletely annulate. The fringes of the female primary are dusky.

Expanse—♂ 28; ♀ 30 m.m.

OBITUARY.

By the recent death of Mr. BRADDISH BILLINGS, of Ottawa, Canada has lost one of her most devoted and enthusiastic sons of science. It has been remarked that the lives of men engaged in scientific enquiries are usually devoid of much interest. The pursuits they follow are not unfrequently above the comprehension, and, consequently, the sympathy of the busy active world. The strife of political partizanship, which engrosses so deeply most minds, has to them little, if any, attraction. Their tastes and habits of thought lead them into other and more congenial fields. The honor or distinction that accrues to them from the successful prosecution of their scientific labors is all they desire. They shun the din and glare of the paths that are generally supposed to lead to fame, content if allowed to pursue their cherished schemes; and hence, when they die, the record of their lives is not usually such as to awaken the interest and excite the attention of the uninitiated outside world. Mr. Billings was no exception in this respect. Leading a quiet and unobtrusive life, and busily absorbed in his favourite pursuits, his name was less known throughout the Province than his high scientific merits deserved. His contributions, however, to the various departments of natural history, we have good reason to believe, were highly appreciated by those most competent to judge of their value,

and more than one foreign scientific society gave his name a place on the roll of their membership. Had he possessed more ambition and been burdened with less modesty, there is scarcely any position in the paths of science to which he might not have successfully aspired. He had what one might almost characterize as a morbid shrinking from publicity. He was out of his element in a crowded room. He loved not the busy haunts of men; but, charmed "by the breath of flowers, he fled from city throngs and cares, back to the woods, the birds, the mountain streams." Much to the regret of his friends, he could never be induced to take prominent part in any public enterprise. As a striking instance of this, and as confirmatory of what is now stated, it may be mentioned that when he was President of the Ottawa Natural History Society—an office to which he was elected as a recognition of his acknowledged ability—he could never be persuaded to preside at any of the meetings. He uniformly, on some pretext or other, always managed to shirk the distasteful duty. Nor did this arise from any want of interest in the proceedings, for he was one of its warmest and most active supporters, and contributed many valuable Botanical and Entomological specimens.

Mr. Billings was born at Billings Bridge, a small village in the immediate neighbourhood of what is now the city of Ottawa, on the 19th of January, 1819. He was descended from a Welsh family that came to America about the year 1740. His grandfather, Dr. Elkanah Billings, after graduating at Harvard University, served for some time as surgeon under Washington, during the Revolutionary War. His father removed to Canada sometime previous to the year 1804, and engaged in lumbering operations on the Rideau River. At this time there was only one house, on the south side of the Ottawa River, within 50 miles of his clearing. The whole of the Ottawa valley was then a comparative wilderness, with few indications of the material prosperity which has since become every where so apparent. It might be interesting to glean some of the incidents connected with the first settlement of this part of Canada, but as this would be foreign to the purpose of this paper, we forbear.

Of the early years of Mr. Billings little need be said; although, by this time, considerable progress had been made by the various settlements that had been gradually formed in this section. Still, as can be easily imagined, he experienced his full share of the trials and hardships incident to a life in the backwoods. Access to books must have been a favor which few enjoyed, and the facilities for education were of the most meagre description.

Accordingly, we find that he was sent to Potsdam Academy, in the State of New York, to prosecute his studies. Here he remained for some considerable period, paying special attention to mathematics, with the view of fitting himself for a land surveyor. He does not appear, however, to have had any special liking for this profession, for he soon gave it up, and betook himself to other avocations. Between the years 1842—52, he held various appointments, such as Clerk of the Crown, Clerk of the Bankrupt Court, Registrar of the Surrogate Court, &c., &c.

In the fall of 1854, he removed with his family to Prescott, where he was appointed General Agent of the Bytown & Prescott Railway. He subsequently, and up to within a short time of his death, held other offices in connection with the same Company. He remained in Prescott until the spring of 1863, when he returned to Ottawa, where he afterward permanently resided. It was while living in Prescott that he began, systematically, the study of Botany and Entomology. These continued to be his favourite branches, although he also gave some attention to Geology and Mineralogy.

Mr. Billings' Botanical collection, which pretty thoroughly exhausted the field around Prescott and Ottawa, consisted of 1897 species, and embraced about one half of the entire number contained in Gray's Manual. It is now the property of the Ottawa Scientific and Literary Society. His collection of Entomological specimens was also extensive and valuable. Besides contributing to the Smithsonian Institute of Washington, and to various private collections, he presented a large assortment of Coleoptera and Lepidoptera to the Literary and Scientific Society of Ottawa. Considering the very limited opportunities at his disposal, it is surprising that he was able to accomplish so much as he did. His close and unrelenting attention to his office duties might have been supposed to discourage him in the prosecution of his favorite researches. But such was not the case. When the day's work was over, it was to him always a source of the highest enjoyment to get away into the country, and hold converse with Nature. He loved not merely the flowers, he also enjoyed the haunts where they are to be found. By the lonely river-bank

"He lingered many summer hours,
Deep in the olden forests he sought the sweet wild flowers."

In later years his attention was mainly directed to Entomology, and to it he devoted every spare hour that chance threw in his way. He was often to be met with, net in hand, in out-of-the-way places, following his

congenial work, and woe betide the heedless buzzing beetle that crossed his path.

Among his contributions to various scientific periodicals may be mentioned the following:—In the *Canadian Naturalist* of February, 1858, and February, 1860, he published a "List of Plants found growing in the Neighbourhood of Prescott." To the annals of the Botanical Society of Kingston, he furnished a "List of Plants growing principally within 4 miles of Prescott, and on Laurentian Rocks west of Brockville, 72 species." In the transactions of the Ottawa Natural History Society, he published a "List of Plants collected in the vicinity of Ottawa during the season of 1866, consisting of 405 species." Occasional papers also from his pen may be found in the CANADIAN ENTOMOLOGIST. In Vol. 1, pages 28 and 60, he discussed the subject "On a station for *Melitæa Phaeton*," and in the same volume, page 45, is a paper on "*Diurnal Lepidoptera* observed in the neighbourhood of Ottawa during the season of 1868." Whether this comprises all that he wrote for the ENTOMOLOGIST we are not in a position to say. Writing scientific articles was a kind of amusement he did not much relish, and but for the importunities of his friends, even the few above mentioned might not have been penned.

That Mr. Billings had made for himself a substantial reputation as a Naturalist, is shown by the fact that he was elected to positions of honor by several scientific societies, as a recognition of the valuable services rendered by him to the cause of Natural History. He was the first President of the Ottawa Natural History Society in 1864. In 1866 he was elected one of the Vice-Presidents of the Entomological Society of Canada. When the Royal Botanical Society of Canada was organized, he was one of the original Fellows. He was also a corresponding member of the Entomological Society of Philadelphia, and of the Portland Society of Natural History.

Mr. Billings died at the comparatively early age of 53, on the 29th of September last, deeply regretted by a large circle of warmly attached friends.—COMMUNICATED.

ABBOTT'S NOTES ON GEORGIAN BUTTERFLIES.

BY SAMUEL H. SCUDDER, BOSTON, MASS.

A few months ago, I spent some time over the rich collection of drawings by Abbott, now in the British Museum. Thinking that some of his memoranda may not be unacceptable to the readers of your maga-

zine, I transcribe the substance of what is written on those butterflies which occur in the North as well as in the South, no copy of the others having been taken. The botanical names of the plants have, in most cases, been inserted in the MSS. by some subsequent student; those which bear the initials A.W.C., are due to the kindness of Dr. Chapman.

The drawings of the butterflies are contained in the 6th and the 16th volumes of the series of Abbott's MSS., the former comprising the perfect insects only, the latter the earlier stages as well. In this article the sequence of the MSS. is followed. The Roman characters refer to the folios, the Arabic to the figures. Names repeated in the two volumes are prefixed by an asterisk.

VOLUME VI.

- *I., 1.—*Glaucus*; not common.
- *III., 7—8.—*Troilus*. Taken March 10; changed to chrysalis Oct. 13; bred March 10; bred again in summer; common.
- *V., 10—11.—*Asterias*. Chrysalis April 20, imago May 2.
- VI., 12—13.—*Philenor*. Common on plum and peach blossoms in the Spring; caterpillar pink-brown; feeds on black snake root (*Aristolochia serpentaria*, A.W.C.); chrysalis April 26, gave imago May 4; chrysalis June 21, gave imago July 5.
- *X., 14—15.—*Ajax*. Flies very swift; chrysalis May 24, gave imago June 16; chrysalis in Autumn, gave imago March 2.
- XI., 60—61.—*Eubule*. Caterpillar yellow, streaked and spotted with blue; chrysalis August 31, gave imago Sept. 10; chrysalis Sept. 24, gave imago Oct. 6; flies very swift.
- XIII., 64—5.—*Philodice*. Taken May 10; rare; common in Virginia.
- XIV., 8.—*Philodice* (pale ♀). Taken March 12; very rare.
- *XV., 66—8.—*Nicippe*. Taken Aug. 7; not common.
- XVI., 69—71.—*Lisa*. Taken Aug. 20; common; frequents and sucks damp ground in yards, etc.
- XIX., 77—8.—*Protodice*. Taken May 13; very rare.
- XX., 79—81.—*Genutia*. Taken May 21; very rare in oak woods.
- *XXI., 18—19.—*Archippus*. Chrysalis April 25, gave imago May 11; not very common; flies very swift.
- *XXIII., 22—3.—*Missipus*; not common.
- XXIV., 48—9.—*Alope*. Not common.
- XXV., 52—3.—*Eurytris*. Common; taken April 14.
- XXVII., 54—5.—*Areolatus*. Taken June 5; in oak and pine woods, on the sides of the branches of trees; common; caterpillar green, and feeds on grass.

- *XXIX., 28—9.—*Huntera*. Feeds on everlasting (*Gnaphalium polycephalum*, A.W.C.) spinning the blossoms together for its retreat; chrysalis April 26, gave imago May 8; chrysalis May 7, gave imago May 16; not very common.
- *XXX., 30—1.—*Cenia*. Chrysalis April 18, gave imago May 4; a second brood in the Autumn; common.
- *XXXI., 36—7.—*Claudia*. Feeds on May-apples (*Podophyllum peltatum*, A.W.C.); taken April 24; breeds again in Autumn; frequents fields near swamps; not very common.
- XXXII., 7.—*Idalia*. Met with by Mr. Elliot in his journey to the mountains.
- XXXII., 43—4.—*Clyton*. Taken May 1 in neighbourhood of swamps; second brood taken September 5, in Ogechee and Savannah River swamps; rare.
- XXXIII., 45—7.—*Celtis*. Taken May 1; very rare; also in swamps.
- XXXIV., 50—51.—*Portlandia*. April 25; not very common.
- *XXXV., 16.—*Ursula*. Feeds on willow, wild gooseberry, and wild cherry; chrysalis June 9; others were bred as early as April 12; not very common; frequents swamps.
- *XXXVII., 24—5.—*Antiope*. One year I met with a brood of these caterpillars on a willow, in number near 300; chrysalis April 24, gave imago May 24.
- XXXIX., 9.—*Faunus*. Met with by Mr. Elliot in his tour to the mountains.
- XL., 32—3.—*Bachmanii*. Frequents blossoms in fields adjoining swamps; not common.
- XLIII., 38—40.—*Pharos*. Taken March 5; common.
- *L., 162—4.—*Calanus*. Taken May 2; common in oak woods; caterpillar greenish-brown, with darker green marks; imago bred April 29.
- *LI., 165—7.—*strigosa*. Feeds on holly and oak; tyed itself up April 27, changed to chrysalis 20th [29?], bred May 6; frequents oak fields and swamps.
- *LV., 173—5.—*niphon*. March 29; very rare; near swamps and oak woods.
- LVI., 176—8.—*mopsus*. May 25; oak woods; very rare.
- LVIII., 13.—*Americana*. Taken by Mr. Elliot in his tour to the mountains.
- *LXVI., 86—7.—*Tityrus*. Spun up in leaves Sept. 5, chrysalis Sept. 7, bred April 10; not very common.

- *LXVII., 88—9.—*Lycidas*. Feeds on beggar's lice (*Desmodium*, A.W.C.); chrysalis July 10, gave imago July 23; taken fresh-bred as early as April 12; frequents swamps, hommocks, and oak woods; not very common.
- LXVIII., 90—91.—*Proteus*. Feeds on wild pea-vine (*Clitoria mariana*, A.W.C.), and kidney beans; spun up July 2, chrysalis July 4, bred August 18; in some years found frequently in oak woods and fields near swamps.
- *LXX., 94—5.—*Bathyllus*. Spun up June 11, bred June 24; common.
- *LXXII., 96—8.—*Fuvenalis*. Bred March 8; common.
- *LXXIV., 43.—*Martialis*. Taken March 8 and June 7.
- *LXXIV., 99—101.—*Brizo*. Feeds on wild indigo (*Baptisia*? A.W.C.); chrysalis July 27, gave out imago Aug. 5; also bred March 22; not so common as *Fuvenalis*.
- LXXV., 102—4.—*Accuis*. Caterpillar green, streaked lengthways with pale white; head streaked with black; feeds on blades of indian corn; chrysalis June 21, gave out imago June 29; also bred April 20; common.
- *LXXVII., 108—9.—*Catullus*. Caterpillar green with a black head; feeds on common and red careless, and lamb's quarter [Abbott and Smith figure it on horsemint, *Monarda punctata*]; spun up June 18, from which imago June 26; chrysalis July 29, gave imago Aug. 5; frequents corn fields near oak woods; not very common.
- LXXVIII., 110—2.—*tessellata*. Taken April 18 and Aug. 21; not very common.
- LXXX., 115—6.—*verna*? Taken Aug. 20; rare.
- *LXXXI., 117—8.—*Samoset*. Taken Aug. 8; rare.
- LXXXII., 119—20.—*textor*. Taken May 8; not common.
- LXXXIII., 121—3.—*vialis*. Taken April 27 in oak woods; not very common.
- LXXXVI., 157—159.—*Vitellius*. Caterpillar of a pale brown-greenish colour; feeds on buffalo-grass; spun July 25, chrysalis July 27, from which imago Aug. 4; not common.
- *LXXXVII., 170—2.—*Tarquinius*. Tied up April 12, chrysalis April 14, from which imago April 25; feeds on alder; frequents swamps and oak woods; rare.
- XC., 130—2.—*Delaware*. Taken Aug. 2; oak woods; not common.
- XCI., 133—4.—*Zabulon*. Taken April 26 in a field; only one met with.
- XCII., 135—7.—*Phytæus*. Taken May 15; feeds on crab-grass (*Panicum sanguinale*, A.W.C.); not very common.

XCV., 141—3.—*Sassacus*. Caterpillar green, head brown; feeds on crab-grass; chrysalis Aug. 20, gave imago Aug. 30; also bred April 12; common.

XCVI., 144—6.—*numitor*. Taken April 27 and Aug. 2; frequents fields in low grounds and in oak woods; not very common.

TO BE CONTINUED.

LONDON BRANCH.

MONTHLY MEETINGS.

March.—The regular monthly meeting was held on Friday evening, March 4, at the residence of Mr. A. Puddicombe.

After the routine business had been disposed of, a letter was read from R. H. Stretch, Esq., San Francisco, Cal., announcing the fact of his having commenced the publication of a new work on Entomology, entitled, "Illustrations of North American *Zygenide* and *Bombycide*." It is to be uniform in size with the "Transactions of the American Entomological Society," and embellished with coloured figures equal in execution to those of Edward's butterflies. The work is to be issued in about thirty parts, each part to contain one plate. Part 1, containing *Alypia* 8 species, *Ctenucha* 6, *Scopis* 1, and *Psychomorpha* 1 species, is now in press.

Intimation having been given by the Fruit Growers' Association of Ontario of their intention to issue a circular to their members, containing questions relating to fruit culture, it was suggested that some queries in reference to insects would be a valuable addition to said circular, and a committee was appointed to prepare queries and confer with the Secretary of the Fruit Growers' Association on this subject.

Mr. Puddicombe's excellent microscope was brought into use, and added much to the interest of the meeting.

April.—The meeting for this month was held on the evening of April 12, at the residence of Mr. Saunders.

The committee appointed to confer with Mr. D. W. Beadle in reference to insect queries, reported that they had completed their task.

Some interesting specimens of micro-lepidoptera were exhibited, which had been recently determined for Mr. Saunders by V. T. Chambers, Esq., Covington, Ky., among which are several species as yet undescribed. Fine photographs of insects were shown, lately received from Mr. Lintner, of Albany.

KINGSTON BRANCH.

ANNUAL MEETING.

The annual meeting of the Kingston Branch was held at the office of the Secretary on the evening of April 11, Prof. Dupuis in the chair. The report of the proceedings of the Society for the last year (the first of its existence) was read, and, on motion, was adopted. Two new members were proposed for election. On motion, Prof. N. F. Dupuis was re-elected President, E. H. Collins, Esq., Vice-President, and R. V. Rogers, jr., Secretary-Treasurer.

After the usual routine work, the members adjourned with the determination that 1872 would see them more devoted and enthusiastic followers in the tracks of the insects hosts than ever.

MISCELLANEOUS NOTES.

DETERMINATION OF SEX.—In view of the occasionally great dissimilarity in the sexes (as now received) of several species of *Lepidoptera*, it would be interesting to know how many of these have been determined from the fact of copulation, seeing that evidence of this nature, although presumptively good, cannot be considered as complete proof that the sexes so seen *in coitu* are sexes of the same species.

Almost every one accustomed to the rearing of insects is doubtless aware of this fact, but it does not seem to be very generally known; and I am tolerably certain that the decision of a very eminent entomologist, (decision perhaps not yet made public), that *H. pocohontas* is merely an aberrant female form of *H. hobomok*, is based entirely on the fact of copulation. But when two such clearly distinct species as *Samia cynthia* and *Callosamia promethea* (we will suppose the generic difference to amount to nothing), and species of such manifestly distinct genera as those of *Epinephle* and *Vanessa* will copulate, I think that we run no great risk in saying that copulation proves nothing, so far as the determination of species is concerned.

Perhaps I should say that I have repeatedly witnessed the copulation of *Cynthia* and *Promethea*, and my information as to *Epinephle* and *Vanessa* comes from a good source. But one instance is as good as a thousand.

It may be that a consideration of this incidental mingling of species

would throw some light on "The Origin of Species;" for although, so far as my knowledge goes, eggs laid by a female which had copulated with a male of different species have never been fruitful, it by no means follows that this is universally the case; and although with animals in a state of domestication, hybrids are not prolific, in a state of nature the case may be different. But this is beside my present purpose.—W.V. ANDREWS.

A VARIETY OF *PIERIS RAPÆ* UNKNOWN IN EUROPE.—Probably not a few of your readers who interest themselves in butterflies have noticed among the swarms of *Ganoris rapæ* occasional specimens differing remarkably from the normal forms in the colour of both surfaces of the wings; these, if we except the dusky markings, are of a sulphur yellow, approaching in depth of colour the wings of *Eurema Lisa*. I have had New England specimens for three years, and since my stay in this country have been endeavouring, most unsuccessfully, to find out the European name of the variety, and with good reason, for to-day having had the pleasure of a call from Mr. H. T. Stainton, of London, I set these specimens before him, and he assured me that they have nothing of the kind on this continent!

Here then we have developed a new variety of an artificially introduced species within a very short time after its appearance in America. It would be well if Mr. Bowles of Quebec, or some one in Montreal, could tell us the year in which this yellow form first appeared. Two of my specimens were taken in June and July, 1869—one by Mr. Merrill, in Shelbourne, N.H., the other by Prof. Hamlin, in Waterville, Me., and all are males. Are they confined to that sex, and the product of the later broods only? I propose to call the variety *novanglia*.—SAMUEL H. SCUDDER, Menton, France, March 6, 1872.

ADVERTISEMENTS.

EXOTIC LEPIDOPTERA AND COLEOPTERA.—I have a large collection of specimens of Lepidoptera and Coleoptera from Australia, Manilla, Mexico and Central America, which I am now arranging for the purpose of sale, as I intend confining myself to Californian insects for the future. I have also a complete set of the Pacific Railroad Survey Reports (13 volumes), in excellent condition, which I shall be glad to dispose of. Apply to JAMES BEHRENS, San Francisco, Cal.

COLLECTING TOUR IN LABRADOR.—When I penned the notice of my proposed tour to Labrador, I had no idea that there would be so much demand for Entomological material from this Northern quarter. But since the notice has appeared, letters have been received from Mr. P. S. Sprague, Boston Natural History Society; Mr. Samuel Henshaw, Boston; Mr. Geo. D. Smith, Boston, for *Coleoptera*; and Dr. Theodore L. Mead, New York; Mr. Herman Strecker, Reading, Pa.; Mr. G. M. Levette, Assist. Geolog. Survey, Indianapolis, for *Lepidoptera*; and having neglected to give my full address, possibly other letters may have gone astray. I want only 12 subscribers for *Lepidoptera*, and the terms are settled by correspondence. I am anxious to put the *Coleoptera* into the hands of one person, or an institution, who could work and determine the material, in order to put the matter in some form for future reference. I will supply notes with every species collected.—WM. COUPER, 38 Bonaventure St., Montreal.

PLATYSAMIA COLUMBIA.—I will give in exchange for a good example of this moth one hundred specimens of *Lepidoptera* of various genera from California, Southern and Atlantic United States, S. America, Europe, East Indian Archipelago, &c., or double the number for two examples; or, if it is preferable, I will pay in money. HERMAN STRECKER, BOX 111, Reading P. O., Berks Cy., Pa. U. S.

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UNITED STATES.—The American Naturalist's Book Agency, Salem, Mass.; J. Y. Green, Newport, Vt.; W. V. Andrews, Room 17, No. 137 Broadway, New York.

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